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**Working Paper**

## Impact of Minimum Wage and Government Ideology on Unemployment Rates : The Case of Post-Communist Romania

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## Impact of Minimum Wage and Government Ideology on Unemployment Rates: The Case of Post-Communist Romania

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### Abstract

*The present paper looks to fill a gap in economic literature by analyzing the relationship between unemployment rates and minimum wage levels in Romania between 1994–2007. The hypothesis tested is that this relationship is nonlinear, with government ideology playing an integral part in determining the unemployment rate through an interaction term. The method of analysis is a time series regression tested with a two-period lag used to eliminate possible endogeneity. Finally, the model is tested for robustness using a 2-lag VAR and a first difference regression. The results appear robust and the evidence seems to point towards a statistically significant non-linear relationship between unemployment and minimum wages. Finally, additional limitations and avenues for expanding the model are suggested.*

**Keywords:** unemployment, political ideology, labor markets, time series, political economy, Romania.

### 1. Introduction

In 1989 the fall of communism caught Romania unprepared for the economic challenges that were about to follow. Restructuring an aged infrastructure, transitioning from a command economy to a market one, privatizing mammoth state owner enterprises that survived solely on government subsidies and learning how to deal with competition were but few of the challenges that the Romanian society as a whole had to address, while transitioning to democracy. However, while implementing the reforms was off to a good start, the process was going to be long and the road bumpy. One category of the population that was continuously affected by these reforms was the working class. Shielded from the realities of a market economy during communism, when employment was controlled and unemployment was virtually zero, the labor force was faced with a new challenge: finding work in a competitive market. During the early years of transition, jobs were cut in an attempt to turn highly inefficient factories into profitable ones. Additionally, privatization brought another wave of layoffs. By 1996, Romania's unemployment rate was higher than most countries in Europe.

Economic theory attributes changes in unemployment to a variety of factors, however, the issue of ideology of the governing party is rarely addressed. The purpose of this analysis is to look at unemployment levels in Romania for the 1994-2007 period and determine to what extent has the orientation of the government in conjunction with minimum wage policies affected its level. The analysis will take the form of a linear regression with unemployment rate as the dependent variable. In addition to the orientation of the government, the level of real minimum wage and the interaction term between the two, the analysis will also control for other factors that affect the level of unemployment (i.e. inflation, real wages, changes in the size of labor force). At the end of the analysis we hope to be able to determine whether there is a significant difference in unemployment when one or the other major party in Romania is responsible with forming a government and choosing minimum wage policies.

The question that this paper is addressing is whether the ideology of the government affects unemployment significantly through the imposition of minimum wage policies. The government orientation determines its goals and strategies. These strategies are reflected in the policies the government implements (for example under certain governments unemployment benefits were tied to the minimum wage). These policies range over too broad of a span to allow for their individual inclusion in an analysis. However, these goals can be traced easily to the political doctrine that promoted them in the first place. And as long as these policies as a whole affect the unemployment rate, the type of government should be considered part of the analysis. Additionally, in the Romanian case, analyzing the effects of government ideology on the level of unemployment makes sense also from the perspective of the country undergoing a painful transition.

Relying heavily on foreign investment in rebuilding the economy or looking inside the country for solutions to the economic crisis the country has been facing, results in different impacts on the level of unemployment. The two coalitions that alternated in power thrice over the period considered did have these antagonistic approaches to rebuilding the country. While the center-right coalition was leaning toward economic growth and rebuilding the economy through privatization and foreign investment, the center left coalition focused more on social protection as a driving force to the reconstruction of society. While privatization and reform were the goal of one party, job protection and populist measures were the policy norm of the other.

## 2. Literature Review

The existing literature has little to offer in this respect. Few publications address the question of government ideology and none addressed the impact of this ideology on unemployment rates through the mechanism of minimum wage setting. Additionally, the question of such an influence is addressed mainly from the perspective of developed countries, with relatively stable economies and little variation in the rate of unemployment. Arguably the closest to this position is the study by Amacher and Boyes (1982). The study develops an empirical framework and tests the hypothesis that there are correlations between the election cycle and the unemployment rate. However, the causality they imply is reversed from the direction investigated by this paper. Their finding is that if the incumbent is successful in reducing unemployment, then he or she has a higher chance of winning the following elections.

Another interesting article is Amable's (2006) analysis of the effect of political ideology on the welfare state. Though not directly investigating the question of unemployment and its evolution, the paper demonstrates strong connections between the ideology of the government and a variety of macroeconomic shocks, proving that the former has an important role and the absorption and propagation of such shocks. One drawback of the study to the present paper is the use of a continuous measure for political ideology, a measure that given available data is impossible to construct. Maybe a more direct relation to the proposed model is the paper by Howel (2006) on the effects of labor market institutions such as employment protection laws, trade unions and unemployment benefits of the unemployment rate. Their statistical analysis finds that out of all the labor market institutions analyzed, only unemployment benefits have a direct impact on unemployment rates. This is extremely relevant to the present paper as in Romania, the unemployment benefits are directly tied to the government mandated minimum wage<sup>1</sup> over the period in question.

In addition, Howel also cites the study by Henry and Nixon on the determinants of unemployment on the UK, namely oil prices, terms of trade and real interest rates. One drawback of the Henry and Nixon study is that their analysis does not take into account the possibility of an autoregressive trend in the unemployment rate. Additionally, both Howel and Henry and Nixon study the determinants of unemployment in the UK, a developed country with a relatively stable economy and relatively small changes in unemployment rates. One paper that addresses changes in payment structures and the unemployment in developing countries is Harrison and Learner's (1997) on the 1981 changes in Chile's payroll taxes. The paper, though, finds little if any evidence of an impact of these policy changes in unemployment and unemployment rates, suggesting that fiscal policy may not have a strong impact on the unemployment level in a country.

Another study focusing on developing countries is Kannappan's (1989) paper on urban labor markets in developing countries. The paper finds a strong relationship between unemployment and growth in developing countries. A problem with this analysis, and with any analysis of labor markets in developing countries is the existence and significant size of informal labor markets. The authors address to some extent the drawback and the result is still consistent. However, Agenor and Montiel (1999) find that this relationship is at best weak, and in many cases "erratic" over time. Badinger and Url (2002), however, suggest that real wages are the main driver of unemployment. Their study on regional labor markets in Austria, suggests that other economic variables that have an impact on unemployment are transaction costs (measured by rental costs), unemployment benefits and regional social assistance plans. Even though the paper addressed regional markets in a developed country, its results may be relevant first through the direct correlation between unemployment and social benefits and the minimum wage mentioned earlier.

<sup>1</sup> Osan, Ioana. *Ajutorul social si de somaj nu vor ma fi corelate cu salariul minim*. UGIR-1903 press release, 30 Oct. 2007.

Overall, there seems to be little agreement in the literature over both the impact of government policy and the effect of minimum wages on unemployment rates. Additionally, most of the work conducted focuses on developed countries and is difficult to adapt to the realities of a developing one. This paper aims to fill in some of the gaps and address the question from an empirical perspective looking at the combined effect of governmental minimum wage policies and the government ideology on the unemployment rates in Romania as it marched the path of transition.

### 3. Data Description

The data used for the model is monthly data covering the period between Jan. 1994 until Aug. 2007. All data presented refers to the non-agricultural sectors of the economy. Chart 1 shows the evolution of the unemployment rate over the period considered. We note a sharp change from December 2001 to January 2002. This change can be attributed to changes in the projected size of the labor force. From January 2002, ILO used the 2001 census data to project the size of the labor force.

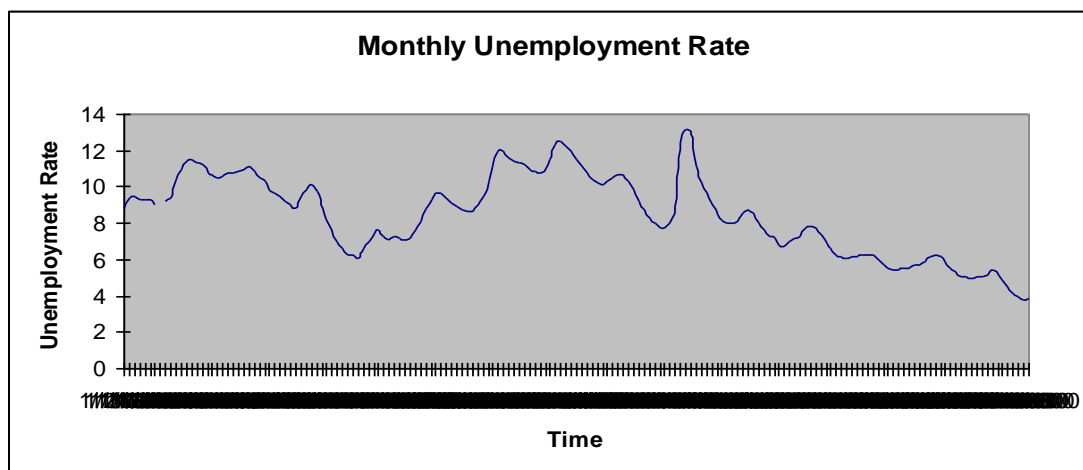
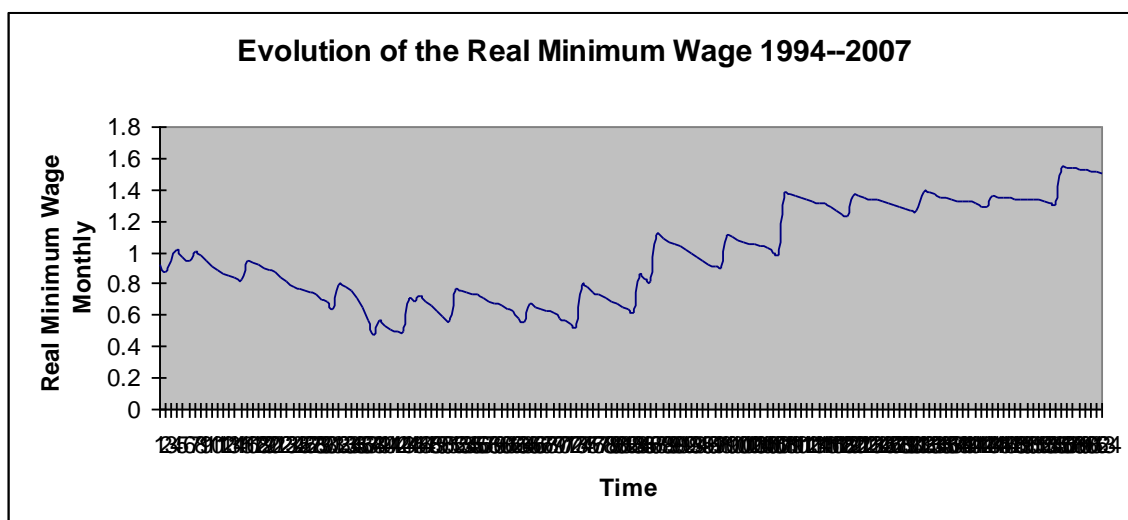


Chart 1. Unemployment Rate in Romania 1993—2007

Variable	Description
Unemployment rate	Unemployment rate for all workers in a given month
Real wages	Real average wages across the economy in non agricultural sectors in any given month measured in RON (prior to 2006 Romania used ROL as its currency. 1 RON=10,000 ROL. Data has been transformed to reflect RON). Data has been transformed from ILO nominal wages data by adjusting them for inflation (using the ILO reported general CPI).
Labor Force Growth	The monthly change in the size of the labor force. This variable is a transformation of the ILO data that expresses the percentage change in the labor force from one month to the next.
Inflation	Measures the monthly inflation. It is computed as a transformation of the ILO data on the value of monthly CPI.
Government	Dummy variable controlling for the party in power. It is set as 1 for a center-right government, and 0 otherwise (center-left).
Minimum Wage	Data uses the Ministry of Labor reported nominal minimum wages, adjusted for inflation using the ILO general price index.
Real Exchange Rate	Monthly average real exchange rate RON/USD. Computed using nominal exchange rate data from the Romanian National bank and the US CPI from ILO.

Table 1. Dependent and Independent Variables.

The two variables of interest are the monthly minimum wage and the government ideology dummy variable. As mentioned before, the monthly minimum wage used in this data set is a transformation of the nominal minimum wage adjusted for monthly changes in the consumer price index. According to the Ministry of Labor reports, the nominal minimum wage has been adjusted 19 times over the period in question. In real terms, we note an increasing trend over time in the real value of the minimum wage (see chart 2).



**Chart 2. Monthly Real Minimum Wage 1994—2007**

The dummy variable measuring the ideology of the government also has rather large number of values in both categories and it also allows for two changes in value. It takes a value of 1 from Jan. 1996 until Dec. 2000 and again from Jan. 2005 until Aug. 2007. This is particularly useful as it not only has an almost equal distribution between the two categories, but it also exhibits three shifts in value allowing for measures that take into account temporal trends. An important mention here is that the study will use a dummy variable, not a continuous one as the literature may suggest mainly because of lack of reliable data. Given the significant changes between the two ideologies, a dummy variable should still capture the differences.

Variable (name in regression)	Mean	Min	Max	Median
Unemployment Rate	8.44%	3.8%	12.53%	8.51%
Inflation	2.53%	-0.07%	30.71%	1.75%
Change in Labor Force	-0.22%	-4.94%	4.86%	-0.31%
Average Real Wage	3.488	2.585	3.992	3.347
Minimum Wage	0.986	0.478	1.015	0.942
Government Ideology	0.44	0	1	0

**Table 2. Descriptive Statistics of Variables.**

#### **4. The Model and Empirical Findings**

The model estimated is a time series regression. In addition to the explanatory variables (minimum wage and government) and the control variables (real wage, labor growth, inflation, real exchange rates) it will also include an interaction term between the two explanatory variables. This will allow us to test whether the relationship between unemployment rates and minimum wages under the impact of government ideology is linear or not. Since the ultimate goal of the analysis is the impact of minimum wages on the unemployment rate, we should start by testing whether such a correlation exists. Running a simple regression of real minimum wages on unemployment rates we note that we are working with a significant model (with 99.9% confidence) and all coefficients are significant (within 99% confidence level).<sup>2</sup>

With these two results in mind we can now proceed with running the main regression. This regression will look at the effect of minimum wages, government ideology and the interaction term on unemployment rates, while controlling for labor force growth, inflation, real exchange rates and real wages in the non-agricultural sector. The equation that we are estimating is:

$$\text{Unemployment}_t = \text{Const.} + b_1 * (\text{Change in CPI})_t + b_2 * (\text{Real Average Wage})_t + b_3 * (\text{Labor force Growth})_t + b_4 * (\text{Real Minimum Wage})_t + b_5 * (\text{Government Ideology})_t + b_6 * (\text{real exchange rates}) + b_7 * (\text{Minimum Wage} * \text{Government Ideology})_t + e_t$$

<sup>2</sup> See Appendix for regression output.

The model is again significant<sup>3</sup> with all coefficients significant within a 95% confidence level. Finally, we note that the sign of the interaction term changes to positive. This suggests that during periods of center-right rule in Romania, the effect of government ideology derived through minimum wage policies resulted in higher unemployment rates.

Testing the model there is no evidence of autocorrelation. The Durbin-Watson statistic for the regression is 1.92863. Additionally, testing for heteroskedasticity we find little evidence at a 95% confidence level. However, a Ramsey test of omitted variables suggests that the model may be missing some important explanatory variables.<sup>4</sup>

Another problem that needs to be addressed by the model is the autoregressive nature of the dependent variable. Considering that we are using monthly data, the unemployment rate in each month would largely be due to unemployment carried over from previous periods. Additionally, when correcting for potential problems of the model we should also be wary of potential endogeneity problems. As the literature suggested, minimum wage policies may impact unemployment rates as much as unemployment rates may impact minimum wages. Additionally, the government ideology and the subsequent policies implemented may also be influenced by the level of unemployment in the country. In order to avoid potential endogeneity problems, the model will be re-estimated using lagged values for explanatory variables. Considering the speed of information penetration in the market, a two period lag seems the best approach.<sup>5</sup>

Re-estimating the model using a two-period lag for variables that are directly affected by information transfers while introducing a two-period lag for the level of unemployment rate, we find that the significance of the model improves dramatically. While one control variable (real wages) becomes insignificant, all the explanatory variables remain significant. Furthermore, the current regression eliminates the autoregressive problem present in the previous model.<sup>6</sup>

In order to further test the robustness of the results, and to eliminate the possibility of multiple endogeneity problems, the model was re-estimated using a 2 lag Vector Autoregressive method<sup>7</sup>. Using this method and treating unemployment rates, minimum wage and government ideology as endogenous, while allowing the other variables to be exogenous, we observe significance in the models estimated. In the estimation of interest (the unemployment rate regression) we continue to see the interaction term significant (though its significance level is only 90% now), while the government lags are no longer significant. More importantly, the signs of the coefficients are consistent with the previously estimated regression.

The final check for robustness conducted was a first difference regression. The model required a regression of independent variables or the first difference of independent variables on the first difference in unemployment rates. Variables such as inflation rates that already capture first differences in economic indicators have been left unchanged. The resulting model is significant and identified. The coefficient of the interaction term remains significant and its sign is consistent with previous estimations.<sup>8</sup>

## 6. Limitations and Future Research

As discussed above, the model presented has a number of limitations. The possibility for measurement error should be addressed by future research. One simple solution would be to test for a structural break in the data, basing it around the change in measure starting in January 2002. Another problem that needs further inquiry is the question of endogeneity. Even though regressions correcting for this problem have return significant results, using a strong instrumental variable that could replace the minimum wage in the model could improve the reliability of the results. Additionally, a different set of controls may also help increase the ability of the model to describe the reality of the transition period in Romania.

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<sup>3</sup> Ibid

<sup>4</sup> For test results see Appendix.

<sup>5</sup> Generally unemployment rates, size of labor force, real wages, and inflation are announced around the middle of the following month by the National Institute for Statistics. This and the time required for the market to adjust to potential changes suggests that a two period lag may be more appropriate than a one period one, because by using the first lag the model would be considering periods when markets do not have any information on the previous period.

<sup>6</sup> Regression results presented in Appendix.

<sup>7</sup> Ibid.

<sup>8</sup> Ibid.

This may prove to be very challenging as the model is basing its results on monthly data, and the availability of reliable monthly data prior to 2000 (other than the data used in estimating the regressions in this model) is virtually zero.

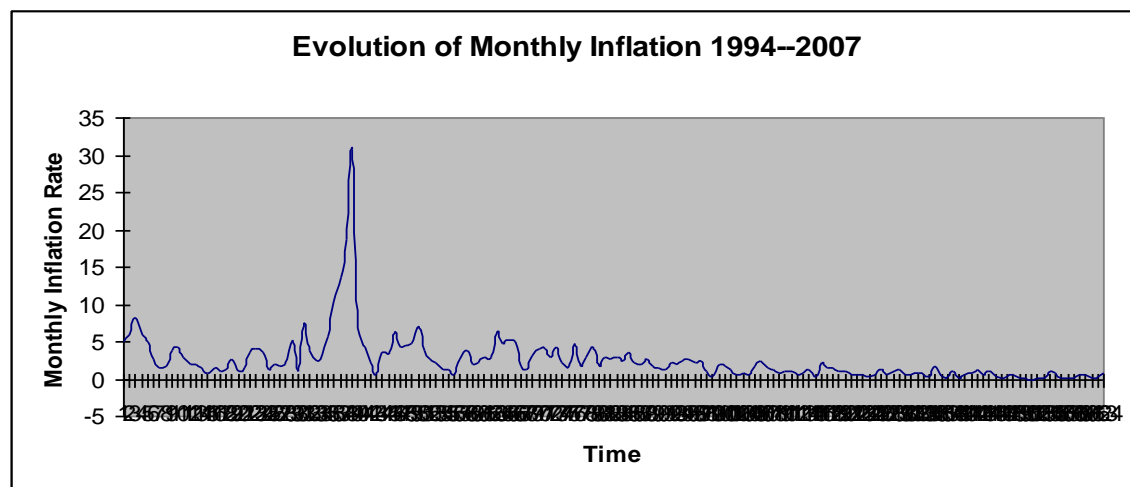
## 7. Conclusion

Even though the initial model presented a number of problems from a statistical point of view, correcting for these problems provided an interesting insight into the evolution of unemployment rates in transitional Romania. As the models have consistently demonstrated there seems to be a non-linear relationship between government minimum wage policies and the rate of unemployment. Specifically, this relationship results in lower unemployment rates during periods of center-right governments. Furthermore, through various specifications of the model, the data on Romania suggests that the ideology of the government itself is also a significant factor in determining the level of unemployment in the country. This result comes to fill in the gap in economic analysis relating to the effects of government ideology and macro-policy on the labor market in general, and unemployment in particular. Given the specific challenges faced by transitional economies, further research may tackle the question by focusing on a similar model estimated across a section of transitional countries over the period of economic changes that brought them from a planned economy to a market driven one.

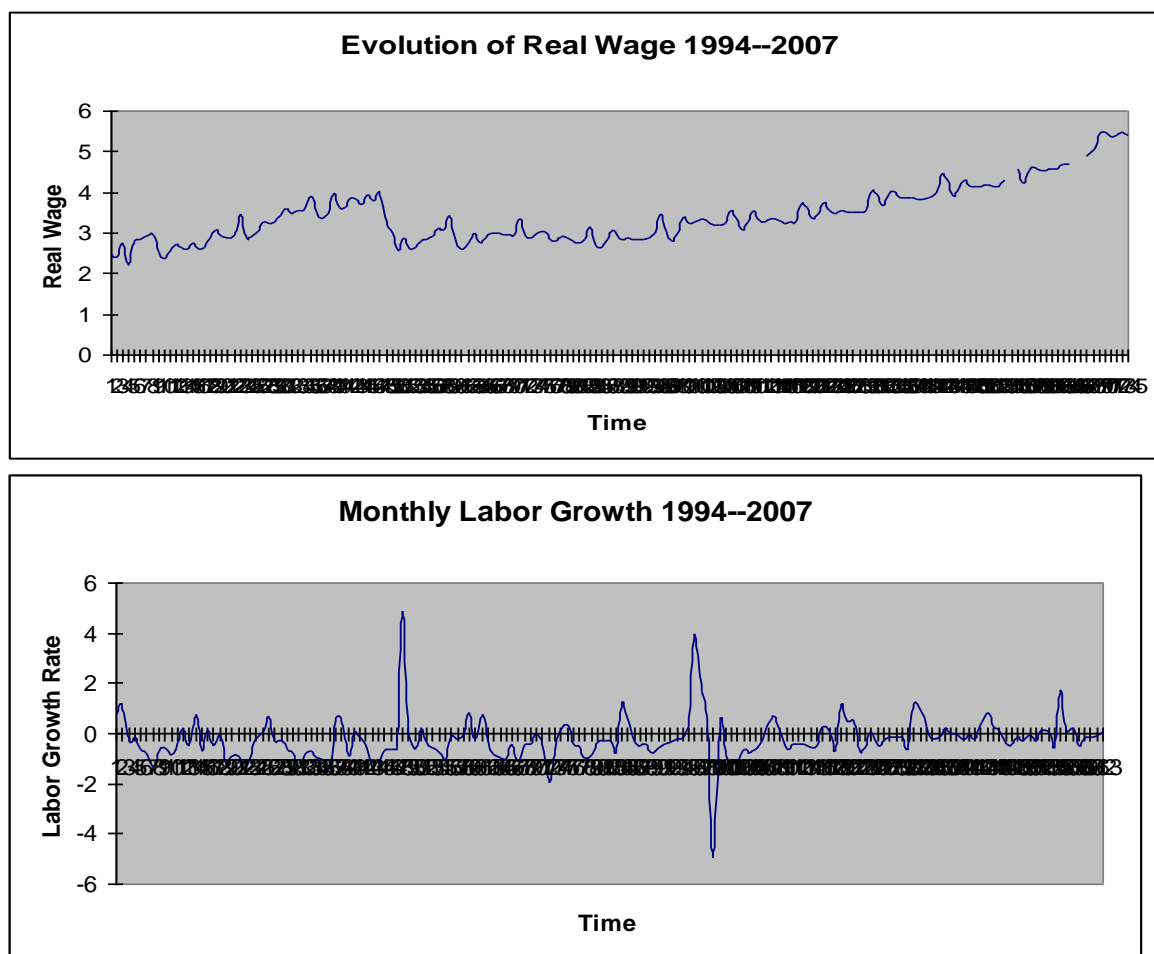
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## Appendix







### Regression of Minimum Wage on Unemployment Rates

Source	SS	df	MS	Number of obs = 174
Model	326.992054	1	326.992054	F( 1, 172) = 109.11
Residual	515.485047	172	2.99700609	Prob > F = 0.0000
Total	842.477101	173	4.86980984	R-squared = 0.3881
				Adj R-squared = 0.3846
				Root MSE = 1.7312

unemploye~e	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
minwr	-4.604099	.4407779	-10.45	0.000	-5.474129 -3.734068
_cons	13.07354	.4570927	28.60	0.000	12.1713 13.97577

### Regression of Minimum Wage and Interaction Term on Unemployment Rates

Source	SS	df	MS	Number of obs = 174
Model	462.0784	2	231.0392	F( 2, 171) = 103.86
Residual	380.398701	171	2.22455381	Prob > F = 0.0000
Total	842.477101	173	4.86980984	R-squared = 0.5485
				Adj R-squared = 0.5432
				Root MSE = 1.4915



unemployme~e	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
minwr	-3.51803	.4045173	-8.70	0.000	-4.31652 -2.71954
inter	-1.744568	.223874	-7.79	0.000	-2.18648 -1.302656
_cons	12.66666	.397252	31.89	0.000	11.88251 13.4508

### Regression of Minimum Wage, Government Ideology and Interaction Term on Unemployment Rates (with controls)

Source	SS	df	MS	Number of obs =	160
				F( 6, 153) =	62.72
Model	567.354515	6	94.5590858	Prob > F =	0.0000
Residual	230.662562	153	1.50759845	R-squared =	0.7110
				Adj R-squared =	0.6996
Total	798.017077	159	5.01897533	Root MSE =	1.2278

unemployme~e	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
minwr	-2.627954	.6218011	-4.23	0.000	-3.856378 -1.399529
inter	2.232099	.808227	2.76	0.006	.6353735 3.828825
gov	-3.002564	.7714095	-3.89	0.000	-4.526554 -1.478575
realwna	-2.451596	.2943733	-8.33	0.000	-3.033157 -1.870035
inflation	-.1074216	.0348489	-3.08	0.002	-.1762688 -.0385744
labgr	.2559031	.1131047	2.26	0.025	.0324545 .4793517
_cons	20.30025	.961926	21.10	0.000	18.39988 22.20062

### Tests for Autocorrelation, Heteroskedasticity and Omitted Variables on Model with Controls.

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: r

chi2(1) = 5.78

Prob > chi2 = 0.0162

Number of gaps in sample: 1

Durbin-Watson d-statistic( 3, 170) = 1.92863

Ramsey RESET test using powers of the fitted values of D.unemploymentrate

Ho: model has no omitted variables

F(3, 164) = 6.64

Prob > F = 0.0003

### Regression with Lagged Values

Source	SS	df	MS	Number of obs =	160
				F( 7, 152) =	245.88
Model	736.798876	7	105.256982	Prob > F =	0.0000
Residual	65.0694779	152	.428088671	R-squared =	0.9189
				Adj R-squared =	0.9151
Total	801.868354	159	5.04319719	Root MSE =	.65428

unemploye~e	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
-----+-----						
minwr						
L2.	-.9764773	.311127	-3.14	0.002	-1.591169	-.3617856
inter	-.5616465	.2692595	-2.09	0.039	-1.093621	-.0296721
gov						
L2.	.5243718	.2524051	2.08	0.039	.0256965	1.023047
realwna						
L2.	-.1303087	.1743587	-0.75	0.456	-.4747881	.2141707
inflation						
L2.	-.0290411	.0188222	-1.54	0.125	-.0662281	.0081459
labgr	.5188889	.0609902	8.51	0.000	.3983911	.6393868
unemploye~e						
L2.	.8414807	.0415697	20.24	0.000	.7593517	.9236096
_cons	2.885882	.8651417	3.34	0.001	1.176627	4.595137

### Vector Autoregression Results

Vector autoregression

Sample:	50	212	No. of obs	=	160
Log likelihood =	314.7144		AIC	=	-3.52143
FPE	= 5.94e-06		HQIC	=	-3.263881
Det(Sigma_ml) =	3.93e-06		SBIC	=	-2.887176

Equation	Parms	RMSE	R-sq	chi2	P>chi2
-----					
unemploymentrate	11	.341842	0.9782	7173.22	0.0000
minwr	11	.067076	0.9547	3373.058	0.0000
gov	11	.097428	0.9634	4206.004	0.0000
-----					

	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
-----+						
unemploye~e						
unemploye~e						
L1.	1.290892	.0615946	20.96	0.000	1.170169	1.411616
L2.	-.3722146	.0615378	-6.05	0.000	-.4928264	-.2516027
minwr						
L1.	-.8523679	.3971133	-2.15	0.032	-1.630696	-.0740401
L2.	.4497565	.3955264	1.14	0.255	-.325461	1.224974
gov						
L1.	.0850425	.2395012	0.36	0.723	-.3843712	.5544563
L2.	.1282696	.204745	0.63	0.531	-.2730231	.5295624
realwna	-.0330802	.0896875	-0.37	0.712	-.2088644	.1427041
inflation	-.0076749	.0100304	-0.77	0.444	-.0273341	.0119843
labgr	.2384057	.0333408	7.15	0.000	.173059	.3037524
inter	-.2942341	.1609748	-1.83	0.068	-.6097389	.0212708
_cons	1.279595	.4581048	2.79	0.005	.381726	2.177464
-----+						
minwr						
unemploye~e						
L1.	.007801	.012086	0.65	0.519	-.015887	.0314891
L2.	-.005678	.0120748	-0.47	0.638	-.0293442	.0179882
minwr						

L1.		.8757992	.0779207	11.24	0.000	.7230773	1.028521
L2.		.0485061	.0776094	0.63	0.532	-.1036054	.2006177
gov							
L1.		-.1673238	.0469944	-3.56	0.000	-.2594312	-.0752164
L2.		.1065018	.0401746	2.65	0.008	.027761	.1852427
realwna		.011774	.0175983	0.67	0.503	-.022718	.0462661
inflation		-.0016967	.0019681	-0.86	0.389	-.0055542	.0021607
labgr		.0077891	.0065421	1.19	0.234	-.0050331	.0206113
inter		.062432	.0315861	1.98	0.048	.0005243	.1243397
_cons		.0253946	.0898884	0.28	0.778	-.1507834	.2015725
-----							
gov							
unemploye~e							
L1.		-.0059033	.017555	-0.34	0.737	-.0403104	.0285038
L2.		-.0166201	.0175388	-0.95	0.343	-.0509955	.0177553
minwr							
L1.		-.1878558	.1131806	-1.66	0.097	-.4096858	.0339741
L2.		-.0075168	.1127284	-0.07	0.947	-.2284603	.2134267
gov							
L1.		.4630178	.0682599	6.78	0.000	.3292309	.5968047
L2.		-.0223148	.058354	-0.38	0.702	-.1366866	.092057
realwna		-.1336546	.0255617	-5.23	0.000	-.1837546	-.0835546
inflation		.0036884	.0028587	1.29	0.197	-.0019146	.0092915
labgr		-.0033901	.0095024	-0.36	0.721	-.0220145	.0152342
inter		.5521238	.0458792	12.03	0.000	.4622022	.6420453
_cons		.8524267	.1305637	6.53	0.000	.5965265	1.108327

**First Difference Regression**

Source		SS	df	MS	Number of obs =	158
-----					F( 6, 151) =	14.02
Model		13.0863431	6	2.18105719	Prob > F	= 0.0000
Residual		23.4832598	151	.155518277	R-squared	= 0.3578
-----					Adj R-squared =	0.3323
Total		36.5696029	157	.232927407	Root MSE	= .39436

uratediff		Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
-----						
minwrdiff		-.0040981	.4719281	-0.01	0.993	-.9365332 .9283369
realwrdiff		.0006729	.1544675	0.00	0.997	-.3045238 .3058697
gov		.4227482	.1573502	2.69	0.008	.1118559 .7336406
inter		-.3729097	.1466214	-2.54	0.012	-.6626041 -.0832152
inflation		.0086003	.0110347	0.78	0.437	-.0132021 .0304027
labgr		.3067968	.0374987	8.18	0.000	.232707 .3808867
_cons		-.0222856	.0495248	-0.45	0.653	-.1201366 .0755654